

BULLION CREEK AND SENTIAL BUTTE FORMATIONS: A STUDY OF RELATIVE DATING AND SPECIMEN DESCRIPTIONS NEAR CARTWRIGHT NORTH DAKOTA

Research Question

Does fossil analysis confirm exposures of Sentinel Butte, Bullion Creek, or both formations at area of focus?

History and Reasoning

- ❖ Sentinel Butte and Bullion Creek Formations were deposited during the Paleocene Period around 55,000 to 65,000 years ago.
- ❖ Cartwright, ND area contains rock exposures; many of which are undocumented historically.
- ❖ Invertebrate fossils and leaf impressions are abundant at this location and can be key to identifying time periods and formations present.

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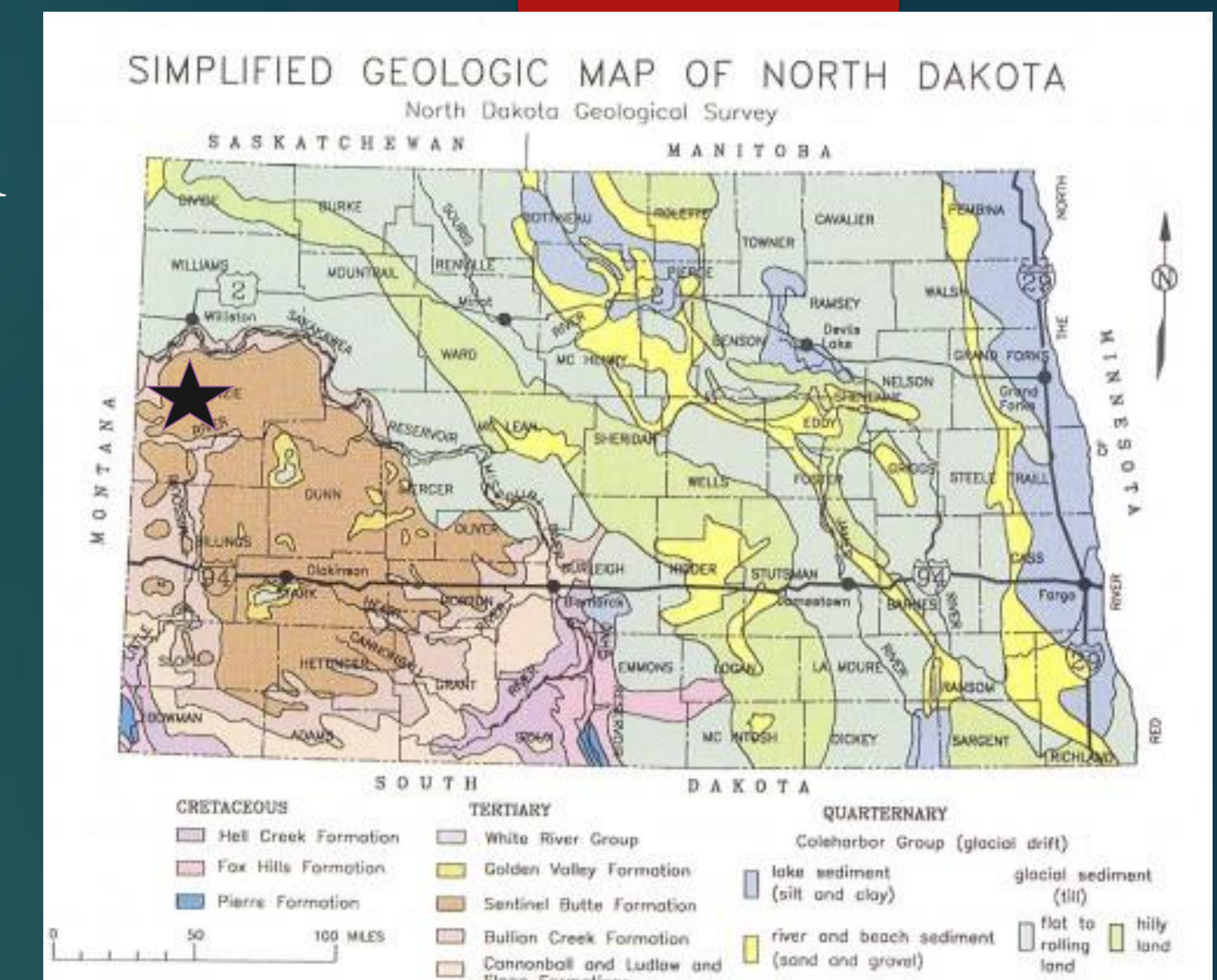
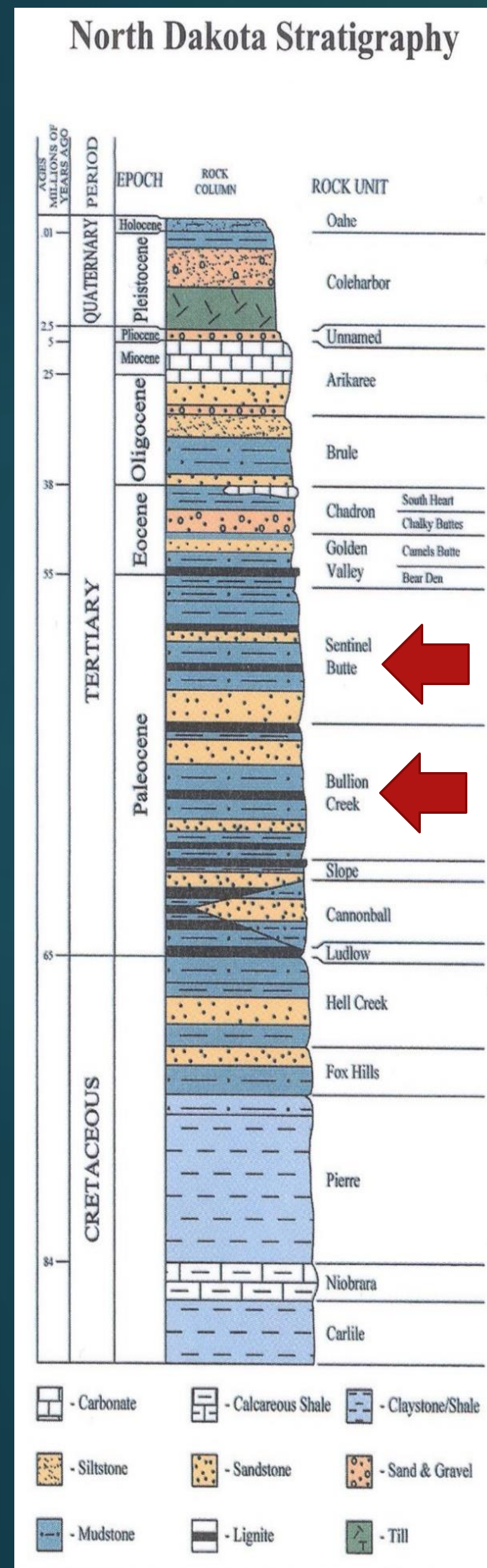


Figure 4 - area of study designated by the star



Processes:

- Fieldwork was performed to collect specimen and data
- Specimens were cataloged and organized in the lab
- Paleontological literature was surveyed in order to identify the specimens.
- Fossil identifications were used to link the local stratigraphy to regional geology, such as Bullion Creek and Sentinel Butte formations.

Data Collection

- Three notable sediment compositions were identified
- 6 specimen groupings of fossilized leaf impressions
- One Class-Level identification
- Four Family-Level identification
- Perpetuation of identified species through both formations

Conclusion

Both Sentinel Butte and Bullion Creek Formations are present within area of focus

Characteristic	Description/Category	Image/Examples
Specimen measurements	Includes lamina length, midvein length, width ratio, and if present base and/or apex dimensions	
Leaf Organization	Simple or Compound (multiple types of compound exist)	
Lamina Shape	Obovate, Ovate, Oblong, Linear, and Elliptic	
Lobation	Unlobed, Palmate, Palmatisect, Pinnate, Pinnatisect, Bilobed, combination	
Margin Type	Untoothed, serrated, dentate, crenate w/wo serrate, erose, sinuous	
Vein Pattern	Arcuate, Cross-Venulate, Dichotomous, Longitudinal, Palmate, Parallel, Pinnate, Reticulate, Rotate	
Unique Characteristics	base symmetry, apex shape or angle, base shape or angle, appearance of abaxial-adaxial plane	

Figure 5 – Table of Characteristics used for fossil leaf specimen identification



Figure 2 – Laying of sediment found at site. Ben DiGiovanni, MSSE student for size comparison.



Figure 3 – Layer of shells found at site



Figure 6 – (above) Magnification of leaf impression found at field site.

Figure 7 (Left)– Largest leaf specimen collected Magnoliopsida Class

Figure 1 – Stratigraphic Column, State Historical Society of North Dakota, Copyright 2020.

Special thanks to Ben DiGiovanni and Dan Lawver